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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,555	02/28/2004	Yuri Glukhoy	Nano-4	9226

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EXAMINER

LEYBOURNE, JAMES J

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/789,555

Applicant(s)

GLUKHOY, YURI

Examiner

James J. Leybourne

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1, 3, 26, 28 and 29 is/are allowed.
- 6) ☒ Claim(s) 2, 4-13, 15-25 and 27 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/28/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:

On page 18, line 24 "applicants" should be "applicant" since there is only one inventor.

On page 24, line 10 "one of the applicants" should be "applicant" since there is only one inventor.

On page 28, line 15 "In the of our invention" needs clarification since there is only one inventor.

Appropriate correction is required.

### ***Claims Objections***

Claim 1, line 14 cites the limitation "detecting positions of collision". The specification states "the only information needed for the analysis is the time of collision and the magnitude of the pulse" (page 30, last paragraph). The examiner interprets "points of collision" to mean, "detecting times of collision".

Claim 14 on page 45, line 15 is objected to because it is misnumbered. It should be "15". Second claim 14 been renumbered 15.

Claim 28, line 11 cites the limitation "electrostatic magnetic". This should be "electrostatic" because the specification states that the mass spectrometer does not use magnetic mirrors (page 29) and a magnetic field is not supported in the specification.

Claim 28, (page 30, line 4) cites the limitation "detecting points of collision". The specification states "the only information needed for the analysis is the time of collision and the magnitude of the pulse" (page 30, last paragraph). The examiner interprets "points of collision" to refer to mean, "detecting times of collision".

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 4-13, 15-25 and 27 are rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "said helical trajectories " in line 10 of page 41. There is insufficient antecedent basis for this limitation in the claim.

Claim 5 recites the limitation "flow deflection unit" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 6 recites the limitation "steering unit" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 23 recites the limitation "electrostatic mirror means" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 23 recites the limitation "quadrupole electrostatic lenses" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 24 recites the limitation "electrostatic mirror" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claims 4, 7-13, 15-22, 25 and 26 are indefinite because they depend on claim 2.

***Allowable Subject Matter***

3. Claims 1, 3, 26, 28 and 29 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding independent claim 1, the prior art fails to disclose or make obvious a time-of-flight mass spectrometer comprising:

an elongated sealed vacuum chamber having at least two inlet ports for admission of at least two flows of charged particles simultaneously and independently of each other

electrostatic field generation means for generating an electrostatic field for causing charged particles of said at least two flows of charged particles to fly along different curvilinear trajectories in a direct path from the input side towards an opposite side of the vacuum chamber and in a return path from said opposite side to said input side, and

a charged particle detector means, located in the vicinity of the inlet ports, means for detecting times of collisions of said charged particles with said charged particle detector means and

means for determining the time of flight of said charged particles independently for each of the at least two flows

Claims 3 and 26 is allowed by virtue of its dependency on claim 1.

4. With respect to the independent claim 28, the prior art fails to disclose or make obvious a method of mass spectrometry with the use of an aerosol time-of-flight mass spectrometer that receives a flow of charged particles, said mass spectrometer having an input side and an opposite side opposite to said input side, particle collision detection means on said input side, and data acquisition and processing means, said method comprising the steps of:

dividing said flow of charged particles into at least two flows of charged particles;

subjecting said charged particles to random pulse modulation

generating an electrostatic field in said mass spectrometer for directing said charged particles along at least two predetermined non-linear trajectories in a direct path from said input side to said opposite side and reflecting said charged particles in a return path from said opposite side to said input side;

detecting times of collision of said charged particles independently for  
particles of each flow;  
generating and measuring collision detection signals independently for  
charged particles of flow  
and analyzing mass distribution of said charged particles of each flow on  
the basis of the signals.

Claim 29 is allowed by virtue of its dependency on claim 28.

5. Claims 2, 4-13, 15-25 and 27 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 2, 4-13, 15-25 and 27 would be allowed by virtue of their dependency on claim 1.

6. The main feature that separates the apparatus and method apart from prior art is using a mass spectrometer that accepts two or more ion beams is forming the beams into curvilinear paths simultaneously, reflecting the beams back towards the entrance ports, detectors located proximate the input ports and detecting and analyzing, the time-of-flight of the two or more beams simultaneously.

### ***Relevant Prior Art***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to show further show the state of the art with respect to time-of-flight mass spectrometers.

USPN 6623935 B2 to Overney et al.

USPN 6661001 B2 to Park.

USPN 6664545 B2 to Kimmel et al.

USPN 5719392 to Fanzen.  
USPN 6870157 B1 to Zare.  
USPN 6198096 B2 to Le Cocq.

***Conclusion***

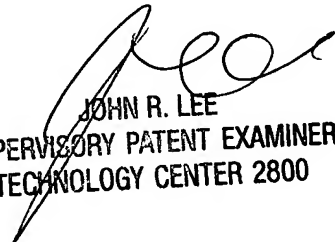
8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James J. Leybourne whose telephone number is (571) 272-2478. The examiner can normally be reached on M-F 9:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 18, 2005  
JJL

  
JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800